UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,488	11/26/2003	Robert A. Sutton	1897A1	9540

7590 12/23/2005

PPG INDUSTRIES, INC.
Intellectual Property Department
One PPG Place
Pittsburgh, PA 15272

EXAMINER	
BERNSHTEYN, MICHAEL	
ART UNIT	**PAPER NUMBER**
1713	

DATE MAILED: 12/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/723,488	SUTTON ET AL.	
	Examiner	Art Unit	
	Michael Bernshteyn	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 82-121 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 82-121 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action follows a response filed on December 1, 2005. No new claims are added. Claims 1-81 and 122-124 were canceled. Claims 82-121 are pending.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 82-121 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-48 of U.S. Patent No. 6,677,422 in view of Dankworth et al. (U.S. Patent 5,650,536) and E. Bruce Nauman ("Chemical Reactor Design, Optimization, and Scaleup", McGraw-Hill, 2002) for the same rationale set forth in the Office action dated on September 1, 2005.

4. Claims 82-103 and 105-121 are rejected under 35 U.S.C. 103(a) as obvious over Coca et al. (U.S. Patent 6,677,422) in view of Dankworth et al. (U.S. Patent 5,650,536) and Nauman ("Chemical Reactor Design, Optimization, and Scaleup", McGraw-Hill, 2002).

As for instant claim 82, Coca discloses a method of making a copolymer composition containing a copolymer, which includes the steps of (a) providing a donor monomer composition that includes an isobutylene type monomer; (b) mixing the donor monomer composition with an ethylenically unsaturated monomer composition that includes one or more ethylenically unsaturated acceptor monomers, and is substantially free of maleate type monomers and fumarate type monomers, and (c) polymerizing the

mixture resulting from step (b) in the presence of a free radical polymerization initiator. The polymerization is carried out in the substantial absence of Lewis acid and/or transition metals (abstract). Coca discloses a donor monomer composition that includes an isobutylene type monomer (formula I), ethylenically unsaturated acceptor monomer (formula III), ethylenically unsaturated monomers (formula IV) in claims 1, 6 and 19.

Coca discloses all substitute groups in formulas I, III and IV (col. 35, lines 3-14, col.35, lines 48-67 and col. 37, lines 1-17), the functional groups incorporated into the copolymer (col. 36, lines 11-16), the initiator (col. 36, lines 17-23), the azo compound (col. 36, lines 31-43), the ethylenically unsaturated acceptor monomer (col. 36, lines 44-51), the sequence of steps in the method of claim 1 (col. 36, lines 53-67), etc. Furthermore, by the virtue of copolymerization of two monomers with different activity towards each other, as in Coca, the alternating copolymers of isobutylene type monomers are inherently formed.

Coca discloses the instantly claimed STR for making such copolymers (examples 1-A through 8-EE, col. 13, line 18 through col. 30 line 34) with using of **stirred** stainless steel **pressure reactor**, which was then **pressured** with nitrogen providing a 5 psig pad on the reactors, mixed and polymerized of charges 1-3 (col. 13, lines 35-38, col. 14, lines 13-15, col. 14, lines 50-53, col. 15, lines 21-23, etc.). The ethylenically unsaturated monomers composition and the free radical polymerization initiator are separately and simultaneously added to and mixed with the donor monomer composition (col.9, lines 12-15), the unreacted portion of the monomer of structure (I) is substantially removed from the resulting copolymer composition by evaporation (col. 9, lines 66-67 and col. 10,

lines 1-2). Coca discloses that after polymerization any unreacted monomer of structure (I) is substantially removed from the resulting copolymer composition by evaporation (col. 36, lines 57-60).

Coca does not disclose maintaining the liquid level in the STR such that there is substantially no air or vapor space in the reactor (82d), and maintaining the monomer compositions and initiator compositions in the STR for residence time sufficient to effect conversion of the monomers to a copolymer composition (82e), and discharging the copolymer composition by way of the outlet; wherein the monomers and initiators are introduced to the STR at essentially the same rate as the copolymer is withdrawn from the STR (82f).

As for claim 82(d), Dankworth discloses a **continuous process** for functionalizing polymer olefins in a continuous stirred tank reactor (CSTR) or pipe reactor. He discloses that CSTR is operated **in the substantial absence of air at constant liquid level** (abstract, line 5-7).

As for claim 82(e), Dankworth discloses that in the CSTR type reactor configuration, liquid and vapor phase reactant are fed to the single stage reactor equipped with mechanical agitator to promote liquid/gas contact and provide uniform concentration throughout the reactor. The CSTR configuration of the invention may use more than one reactor (col. 13, lines 66-67 and col. 14, lines 1-4) and static mixers provide **residence time for reaction** (col. 14, lines 32-35, col. 21, lines 54-57). The reactants are fed to the process by pump or compressors and mixed together just before or just after entering the reactor or CSTR (col.13, lines 56-58).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to operate the STR in Coca's working examples in the substantial absence of air at constant liquid level and maintain the monomers and initiator compositions in the STR for a residence time sufficient to effect the conversion of the monomer to a copolymer as taught by Dankworth, because it has been working successfully in Dankworth's CSTR process and an ordinary skilled in the art would have expected such embodiments also work successfully into Coca's polymerization process, and without a number of drawbacks when used commercially comparing with copolymer compositions that contain Lewis acid and/or transition metals intermingled with the copolymer (US' 536, col. 3 lines 14-17).

It is noted that the substantial absence of air at constant liquid level and the residence time of the reaction are the result effective variables, and therefore, it is within the skill of those skilled in the art to find the optimum values of the result effective variables, as per ***In re Boesch*** 205 USPQ 215 (CCPA 1980). See also ***In re Peterson***, 315 F.3d at 1330, 65 USPQ2d at 1382: "The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages."

As for claim 82(f), wherein the monomers and initiators are introduced to the STR at essentially the same rate as the copolymer is withdrawn from STR and any unreacted monomers of structure (I) are removed from the copolymer and used as part of at least one of monomer compositions in (b), Dankworth discloses that the reactor contents can

then be **discharged** (col. 13, lines 48-49). Also, Nauman discloses that recycling of partially reacted feed streams is usually carried out after the product is separated and recovered. **Unreacted feedstock can be separated and recycled to (ultimate) extinction**. It is a loop reactor where some of the reaction mass is returned to the inlet without separation. Internal recycle exists in every stirred tank reactor. An external recycle loop... is less common, but is used, particularly in large plants where a conventional stirred tank would have heat transfer limitations (page 139).

Therefore, in the absence of showing the criticality, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the same rate for incoming and outcoming components as taught by common teaching of Dankworth and Nauman, in Coca's process to prevent the accumulation of the products in STR from one side and to increase the efficiency of the method from another side.

With regard to the limitation of the instant claims 83-103 and 105-121, Coca discloses the limitations of dependent claims 2-48 of US 6,677,422 (col. 35, lines 30 through col. 40, line 60) which are identical to the limitations of dependent claims of Application (claims 83-99, 120-121).

Dankworth discloses the limitations of dependent claims of Application (claims 100-105, 107-111, 114-115, 117-119).

With regard to the limitation of the instant claim 106, wherein the pressure in the STR is from 300 to 1,000 psig, Dankworth discloses that useful pressure can be up to 20,000 psig, and typically will be at least 300 psig, and most preferable at least 1000 psig (col. 13, lines 30-33).

With regard to the limitation of the instant claims 112 and 113, Dankworth discloses that the CSTR configuration of the invention may use more than one reactor ...although a single stage is simpler and less expensive. Multiple stages may be used to reduce total volume and residence time (col. 14, lines 3-6).

With regard to the limitation of the instant claim 116, wherein after discharging the copolymer composition in (f), the copolymer composition is fed to a wipe film evaporator, Dankworth discloses that the product is moved by pump preferably through a wiped film evaporator (col. 16, lines 27-28). Also, wiped film evaporators and methods for their use are known in the art and described, for example, in U.S. Patterns 3,687,983, 3,695,327, 4,054,485, US 20040211657 (filing date 04/11/2003), etc.

5. Claim 104 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coca and Dankworth as applied to claims 82-103, and 105-121 above, and further in view of Jarvis et al. (U.S. Patent 4,728,701).

Combined teaching of Coca and Dankworth does not disclose the limitation of the instant claim 104, wherein a back pressure control valve is positioned on the outlet. Jarvis discloses a process for the polymerization of acrylates, which is preferable conducted in CSTR under sufficient agitation to provide a homogeneous reacting mass (col. 2, lines 36-40). The transfer line 39 (Figure) is provided with a **back pressure control valve 72**, which is responsible to the discharge pressure of polymer gear pump 25 (col. 6, lines 29-34).

Therefore, It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a back pressure control valve as taught by

Jarvis into Coca's process in order to obtain the aforementioned advantages in the absence of showing any criticality of the record.

Therefore, it is the examiner position to believe that method characterized by exactly the same polymerized monomers of formulas I, III and IV and exactly the same sequence of processing steps in US'422 (col. 3, line 28 through col. 30, line 12) would be identical to the instant claimed method of making copolymers containing olefinic type monomers. Furthermore, by the virtue of copolymerization of two monomers with different activity towards each other, as taught by Coca and Dankworth, the alternating copolymers of olefinic type monomers are inherently formed.

Response to Arguments

Applicant's arguments filed December 1, 2005 have been fully considered but they are not persuasive. The crux of Applicants arguments are the following: the key to the process is maintaining the liquid level in the STR such that there is no air or vapor space in the reactor and there is no disclosure or suggestion in the claims of the Coca's patent of a continuous process for making the polymer in which the polymer is withdrawn from the STR at essentially the same rate that the monomers and initiators are introduced and any unreacted monomers are removed from the polymer and used at least as part of one of the monomers being fed to the reactor.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention

where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Coca's and Dankworth patents clearly disclose the methods of making a copolymer composition, and all the limitations of the instant claims are expressly met by common teaching of Coca and Dankworth.

In the absence of criticality in the specification (see page 19-22, [0080-0091], examples 1-6) of maintaining the liquid level in the STR and introducing the monomers and initiators at the same rate as the copolymer is withdrawn from the STR composition, it is the examiner position to believe that method characterized by exactly the same polymerized monomers and the same sequence of processing steps in US'422 (col. 3, line 28 through col. 30, line 12) would be substantially identical to the instant claimed method of making copolymers containing olefinic type monomers.

It is axiomatic that one who performs the steps of a process must necessarily produce all of its advantage. Mere recitation of a newly discovered property or function what is inherently possessed by the things or steps in the prior art does not cause a claim drawn to those things to distinguish over the prior art. ***Leinoff v. Louis Milona & Sons, Inc.*** 220 USPQ 845 (CAFC 1984).

Therefore, in view of the discussion above, the rejection of record has not been withdrawn.

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Bernshteyn whose telephone number is 571-272-2411. The examiner can normally be reached on M-F 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Bernshteyn
Patent Examiner
Art Unit 1713

MB
12/19/2005

DAVID W. WU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700